36

CLAIMS

1. An image processing apparatus for synthesizing a hair image with a three-dimensional shape image of a head part, to generate a hair-style-matched image, comprising:

storage means for storing a hair-style data piece;

read out means for reading out the hair-style data piece stored in the storage means;

mapping means for mapping a hair data piece corresponding to a hair contained in the hair-style data piece read out by the read out means, at a predetermined position on the three-dimensional shape image of the head part; and

generation means for generating the hair-style-matched image, based on a mapping result obtained by the mapping means.

2. The image processing apparatus according to claim 1, wherein the hair data piece is three-dimensional curve data which is constructed by a plurality of control points.

3. The image processing apparatus according to claim 1, wherein the hair data piece is polygon data which is constructed by a plurality of polygons.

4. The image processing apparatus according to claim 1, wherein the storage means stores the hair-style data piece constructed by plural hair data pieces arranged on a two-dimensional array.

5. The image processing apparatus according to claim 1, wherein the

storage means stores the hair-style data piece constructed by plural data pieces arranged on a two-dimensional array corresponding to a projected image obtained by projecting a three-dimensional hair style expressed by a columnar coordinate system, on a two-dimensional coordinate system.

6. The image processing apparatus according to claim 1, further comprising interpolation means for interpolating the hair data piece at the predetermined position, with use of a hair data piece close to the predetermined position.

7. The image processing apparatus according to claim 6, wherein the interpolation means interpolates the hair data piece, based on group information contained in the hair data piece close to the predetermined position.

8. The image processing apparatus according to claim 1, wherein the mapping means includes coordinate conversion means for converting the hair data piece expressed by a first coordinate system into data of a second coordinate system by which the three-dimensional shape image of the head part is expressed.

9. The image processing apparatus according to claim 8, wherein the coordinate conversion means converts the hair data piece expressed by the first coordinate system into data of a local coordinate system having an origin on a surface of the head part, and thereafter converts the data into data of the second coordinate system by which the three-dimensional shape image of the head part is expressed.

10. The image processing apparatus according to claim 8, wherein when the hair data piece expressed by the first coordinate system is converted into the data of

the second coordinate system by which the three-dimensional shape image of the head part is expressed, the coordinate conversion means executes at least one of coordinate axis rotation and origin shift, based on a random number.

11. An image processing method for synthesizing a hair image with a three-dimensional shape image of a head part, to generate a hair-style-matched image, comprising:

a storage step of storing a hair-style data piece;

a read out step of reading out the hair-style data piece stored by processing in the storage step;

a mapping step of mapping a hair data piece corresponding to a hair contained in the hair-style data piece read out by processing in the read out step, at a predetermined position on the three-dimensional shape image of the head part; and

a generation step of generating the hair-style-matched image, based on a mapping result obtained by processing in the mapping step.

12. The image processing method according to claim 11, wherein the hair data piece is three-dimensional curve data which is constructed by a plurality of control points.

13. The image processing method according to claim 11, wherein the hair data piece is polygon data which is constructed by a plurality of polygons.

14. The image processing method according to claim 11, wherein by the processing in the storage step, the hair-style data piece constructed by plural hair data

pieces arranged on a two-dimensional array is stored.

15. The image processing method according to claim 11, wherein in the processing in the storage step, the hair-style data piece constructed by plural hair data pieces arranged on a two-dimensional array corresponding to a projected image obtained by projecting a three-dimensional hair style expressed by a columnar coordinate system, on a two-dimensional coordinate system, is stored.

16. The image processing method according to claim 11, further comprising an interpolation step of interpolating the hair data piece at the predetermined position, with use of a hair data piece close to the predetermined position.

17. The image processing method according to claim 16, wherein in processing in the interpolation step, the hair data piece is interpolated, based on group information contained in the hair data piece close to the predetermined position.

18. The image processing method according to claim 11, wherein the processing in the mapping step includes a coordinate conversion step of converting the hair data piece expressed by a first coordinate system into data of a second coordinate system by which the three-dimensional shape image of the head part is expressed.

19. The image processing method according to claim 18, wherein in processing in the coordinate conversion step, the hair data piece expressed by the first coordinate system is converted into data of a local coordinate system having an origin on a surface of the head part, and thereafter, the data is converted into data of the second coordinate system by which the three-dimensional shape image of the head part

is expressed.

20. The image processing method according to claim 18, wherein when the hair data piece expressed by the first coordinate system is converted into the data of the second coordinate system by which the three-dimensional shape image of the head part is expressed, at least one of coordinate axis rotation and origin shift is executed, based on a random number, in processing in the coordinate conversion step.

21. A recording medium which records a computer-readable program for image processing of synthesizing a hair image with a three-dimensional shape image of a head part, to generate a hair-style-matched image, the program comprising:

a storage step of storing a hair-style data piece;

a read out step of reading out the hair-style data piece stored by processing in the storage step;

a mapping step of mapping a hair data piece corresponding to a hair contained in the hair-style data piece read out by processing in the read out step, at a predetermined position on the three-dimensional shape image of the head part; and

a generation step of generating the hair-style-matched image, based on a mapping result obtained by processing in the mapping step.

22. The recording medium according to claim 21, wherein the hair data piece is three-dimensional curve data which is constructed by a plurality of control points.

23. The recording medium according to claim 21, wherein the hair data piece

is polygon data which is constructed by a plurality of polygons.

24. The recording medium according to claim 21, wherein by the processing in the storage step, the hair-style data piece constructed by plural hair data pieces arranged on a two-dimensional array is stored.

25. The recording medium according to claim 21, wherein in the processing in the storage step, the hair-style data piece constructed by plural data pieces arranged on a two-dimensional array corresponding to a projected image obtained by projecting a three-dimensional hair style expressed by a columnar coordinate system, on a two-dimensional coordinate system, is stored.

26. The recording medium according to claim 21, wherein the program further comprises an interpolation step of interpolating the hair data piece at the predetermined position, with use of a hair data piece close to the predetermined position.

27. The recording medium according to claim 26, wherein in processing in the interpolation step, the hair data piece is interpolated, based on group information contained in the hair data piece close to the predetermined position.

28. The recording medium according to claim 21, wherein the processing in the mapping step includes a coordinate conversion step of converting the hair data piece expressed by a first coordinate system into data of a second coordinate system by which the three-dimensional shape image of the head part is expressed.

29. The recording medium according to claim 28, wherein in processing in

the coordinate conversion step, the hair data piece expressed by the first coordinate system is converted into data of a local coordinate system having an origin on a surface of the head part, and thereafter, the data is converted into data of the second coordinate system by which the three-dimensional shape image of the head part is expressed.

30. The recording medium according to claim 28, wherein when the hair data piece expressed by the first coordinate system is converted into the data of the second coordinate system by which the three-dimensional shape image of the head part is expressed, at least one of coordinate axis rotation and origin shift is executed, based on a random number, in processing in the coordinate conversion step.